Remarks

Claims 1 to 4 and 8 to 19 are pending. Claims 1 to 4 and 8 to 19 have been rejected.

§ 103 Rejections

Claims 1 to 4 and 8 to 16 stand rejected under 35 USC § 103(a) as being unpatentable over Kling (US 2002/0048972) in view of Brandt (U.S. 6,068,782).

The Office Action states in part:

Claims 1 -4 and 8 -16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kling et al. (US 2002/0048927 A1, Kling) in view of Brandt et al. (USPAT 6068782, Brandt). With regard to claim 1, Kling discloses in figure 1 an electronic package. Kling discloses in figures 1-3b a conductive trace layer (Pads in figure 3b) having a first side and a second side, the conductive trace layer being patterned to define a plurality of interconnect pads. Kling discloses in figures 1-3b a dielectric substrate (16, see figure 1) mounted on the first side of the conductive trace layer. Kling discloses in figures 1 -3b and paragraph 18 an embedded capacitor (14 in figure 1) having a capacitance of 50 nF/sq.cm including a first conductive layer (Power plane, figure 3b), a second conductive layer (Digital ground plane, figure 3b) and a layer of dielectric material (labeled AlO_2 in figure 3b) made of a non-conductive polymer (polyimide) disposed between the first and the second conductive layers, the first conductive layer attached to the second side of the conductive trace layer by a first adhesive layer (labeled SiO_2 in figure 3b). Kling does not disclose that the dielectric material is made of a non-conductive polymer blended with high dielectric particles. Brandt discloses in column 4, lines 18 - 41 a suitable dielectric material made of a non-conductive polymer blended with high dielectric particles. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the dielectric material of Brandt in the method of Kling in order to tune the electronic properties of a capacitor component as stated by Brandt in column 4, lines 22 –41. Further, Kling teaches in paragraph 18 that any suitable dielectric material. Kling discloses in figures 3a and 3b a plurality of interconnect regions (one shown in figure 3b just to the right of the" AlO_2" arrow) extending through the first conductive layer and the dielectric material layer of the capacitor. Kling discloses in figure 1 an interconnect member (in figure 3b shown as the dark line lining the

interconnect regions) connected between each of the conductive layers of the capacitor and a corresponding set of the interconnect pads, the first conductive layer of the capacitor being electrically connected to a first set of the interconnect pads and the second conductive layer on the capacitor being electrically connected to a second set of the interconnect pads, the interconnect members corresponding to the second set of interconnect pads extending through one of the interconnect regions.

With regard to claim 2, Kling discloses in figures 1-3b wherein the first electrode is maintained at a first reference voltage and wherein the second electrode is maintained at a second reference voltage different from the first reference voltage. It is well known in the art that power and ground planes are maintained at reference voltages.

With regard to claim 3, Kling discloses in figure 1 and in paragraph 38 an electrically conductive stiffening member (12) attached to the second conductive layer of the capacitor by a second adhesive layer (dark line between capacitor and substrate).

With regard to claim 4, Kling discloses in figure 1 and paragraph 38 a device receiving region (directly under 22) extending through the dielectric substrate, the conductive trace layer and the capacitor, and further comprising an electronic device (22) attached to the device receiving region on the stiffening member by a third adhesive layer.

With regard to claims 8 - 9, Kling discloses in figure 1 a capacitor that has a capacitance of 50 nF/sq.cm. It is not clear if Kling teaches that the capacitor has a capacitance of about 2 nF/sq.cm. to about 30 nF/sq.cm. MPEP 2144.05 states that the optimization of ranges within the prior art conditions, or through routine experimentation is obvious. It would have been obvious to one of ordinary skill in the art to

use a capacitor that has a capacitance of about 2 nF/sq.cm to about 30 nF/sq.cm because the optimization of ranges would have been obvious through routine experimentation in Kling. Further, Kling states in paragraph 34 that one of ordinary skill in the art will be able to select a proper capacitance for the capacitor suitable to decouple the circuit.

With regard to claim 10, Kling teaches in figure 1 a capacitor that has a capacitance of 50 nF/sq.cm. It is not clear if Kling teaches that the capacitor has a capacitance of at least 30 nF/sq.cm. MPEP 2144.05 states that overlapping ranges are obvious. It would have been obvious to one of ordinary skill in the art to use a capacitor that has a capacitance of at least 30 nF/sq.cm in the device of Kling because the current claimed range and the disclosed range in Zhang[1] overlap. Further, Kling states in paragraph 34 that one of ordinary skill in the art will be able to select a proper capacitance for the capacitor suitable to decouple the circuit.

With regard to claim 11, Kling teaches in paragraphs 34 and 35 wherein the dielectric material thickness depends on the application. Brandt teaches in column 4, lines 35 -37 wherein the dielectric material of a capacitor has a thickness of 10 urn. It would have been further obvious to one of ordinary skill in the art at the time of the present invention to use the dielectric thickness of Brandt in the device of Kling in order to have a useful thickness for a dielectric layer of a capacitor in a semiconductor package as stated by Brandt in column 4, lines 35 - 37.

With regard to claim 12, Brandt discloses in column 4, lines 18 - 41 wherein the dielectric material of the capacitor includes a metal oxide.

With regard to claim 13, Brandt discloses in column 4, lines 18 - 41 the high dielectric constant particles are formed from a material of lead zirconium titanate.

With regard to claim 14, Kling discloses in figures 1-3a wherein the dielectric substrate (first layer of 16) includes a plurality of apertures, each one of the apertures being positioned adjacent to one of the interconnect region of the capacitor.

With regard to claims 15 -16, Kling discloses in figures 1-3a and paragraph 32 wherein the dielectric substrate includes a polyimide. It should be noted that Kling directly references Eichelberger (US PAT 5841193) for this teaching in paragraph 32.

According to MPEP 2142, to establish a case of prima facie obviousness, three basic criteria must be met: 1) there must be some suggestion or motivation, either in the references or generally known to one skilled in the art, to modify or combine reference teachings, 2) there must be reasonable expectation of success, and 3) the prior art references must teach or suggest all the claim limitations. The ability to modify the method of the references is not sufficient. The reference(s) must provide a motivation or reason for making the changes. *Ex parte Chicago Rawhide Manufacturing Co., 226 USPQ 438 (PTO Bd. App. 1984).*

Applicants respectfully submit that the Office Action misinterprets the teachings of Kling. The Office Action states that item 16 in Fig. 1 of Kling is a dielectric substrate. However, it is clearly stated in Kling that item 16 is an interconnect layer having at least one metal layer. See, e.g., paragraphs 27 and 40. Accordingly, Kling does not disclose a dielectric layer mounted on one side of a trace metal layer. Additionally, the Office Action states that the SiO_2 (silicon oxide) layer in Fig. 3b is an adhesive. Applicants submit that it is known in the art

that SiO2 is not an adhesive. Furthermore, Kling does not teaches the use of an adhesive layer between a conductive trace layer and a conductive layer of a capacitor.

Based on the foregoing, Applicants respectfully submit that the references cannot support a case of *prima facie* obviousness as to the claims because, among other possible reasons, the cited references do not disclose all the elements of the present invention.

For these reasons, Applicant(s) submit that the cited references will not support a 103(a) rejection of the claims invention and request that the rejection be withdrawn.

Claims 17 to 19 stand rejected under 35 USC § 103(a) as being unpatentable over Kling (US 2002/0048972) and Brandt (U.S. 6,068,782) as applied to claim 1 above, and further in view of Fujisawa (U.S. 6,184,457).

The Office Action states in part:

> With regard to claim 17, Kling discloses in figures 1-3 an interconnect member. Kling does not teach that the interconnect member is a solder plug. Fujisawa discloses in figure 1 wherein the interconnect member is a solder plug. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the solder plug of Fujisawa in the device of Kling and Brandt in order to electrically fill the interconnect with a material which is widely available and understood in the art.
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> With regard to claim 18, Kling discloses in figure 1 wherein an interconnect pad. Kling does not teach wherein each interconnect pad is a solder pad. Fujisawa teaches in figure 8 interconnect pad (28 and 32) is a solder pad. It would have been obvious to one of ordinary skill in the art at the time of the present invention to use the solder pad of Fujisawa as the interconnect pad in the device of Kling and Brandt in order to use pad material which is widely available and understood in the art.

According to MPEP 2142, to establish a case of prima facie obviousness, three basic criteria must be met: 1) there must be some suggestion or motivation, either in the references or generally known to one skilled in the art, to modify or combine reference teachings, 2) there must be reasonable expectation of success, and 3) the prior art references must teach or suggest all the claim limitations. The ability to modify the method of the references is not sufficient. The reference(s) must provide a motivation or reason for making the changes. *Ex parte Chicago Rawhide Manufacturing Co., 226 USPQ 438 (PTO Bd. App. 1984).*

Applicants respectfully submit that, for the same reasons given in the response above to the rejection of claims 1 to 4 and 8 to 16, the references cannot support a case of *prima facie*

obviousness as to the claims because, among other possible reasons, the cited references do not disclose all the elements of the present invention.

For these reasons, Applicant(s) submit that the cited references will not support a 103(a) rejection of the claims invention and request that the rejection be withdrawn.

In addition to the foregoing arguments, Applicant(s) submit that a dependent claim should be considered allowable when its parent claim is allowed. *In re McCairn*, 1012 USPQ 411 (CCPA 1954). Accordingly, provided the independent claims are allowed, all claims depending therefrom should also be allowed.

Based on the foregoing, it is submitted that the application is in condition for allowance. Withdrawal of the rejections under 35 U.S.C. 103 is requested. Examination and reconsideration of the claims are requested. Allowance of the claims at an early date is solicited.

The Examiner is invited to contact Applicant(s)' attorney if the Examiner believes any remaining questions or issued could be resolved.

Respectfully submitted,

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Date

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